KEYSAFE SYSTEM WITH TIMER/CALENDAR FEATURES

RELATED APPLICATION DATA

This application is a continuation in part of copending U.S. application Ser. No. 07/192,853, filed May 11, 1988, now abandoned, which in turn is a division of U.S. application Ser. No. 07/015,864, filed Feb. 17, 1987, now U.S. Pat. No. 4,766,746, which in turn is a continuation in part of application Ser. No. 06/831,601, filed Feb. 21, 1986, now U.S. Pat. No. 4,727,368, which in turn is a continuation in part of copending application Ser. No. 06/814,364, filed Dec. 30, 1985, now abandoned, which in turn is a continuation in part of Ser. No. 06/788,072, filed Oct. 16, 1985, now abandoned. These applications are incorporated herein by reference.

BACKGROUND AND SUMMARY OF THE INVENTION

The present invention relates to real estate lockboxes and other secure entry systems. Lockboxes are used in the real estate industry to contain the keys of houses listed for sale. Prior art lockboxes have primarily been mechanical devices which allow access to a secure compartment by use of a conventional key. Such lockboxes and keys, however, have had numerous disadvantages. These disadvantages have been overcome by the present invention and a great number of new features have been provided.

According to the present invention, an electronic lock system is provided in which a key can be assigned a limited lifetime, such as by storing data indicative of an expiration date in a key memory. Whenever the key is used with a lock, the lock first examines this key data and verifies that the key is still timely before performing any operations. After a key's expiration date has passed, it is useless until a new expiration date is stored in its memory. By this arrangement, keys that are lost or stolen soon lose their efficacy and no longer pose a threat to system security. The invention also permits the lock administrator to issue keys with different useful lives, so that, for example, a person who needs a key for only one day can be issued a key that expires the next day.

Yet another feature of the invention is an arrangement whereby a user can log into a lockbox's access log without opening the lockbox.

Still another feature of the invention is an arrangement whereby an agent who has listed a house can require visiting agents to enter an auxiliary access code before being allowed to open the lockbox.

Yet another feature of the invention is the ability of the lockbox to render certain keys inoperative until they are reprogrammed.

Still another feature of the invention is the recording of detailed diagnostic data about recent lockbox and key operations in order to facilitate resolution of anomalous lockbox and key behavior.

Yet another feature of the invention is the ability of the lockbox to recognize the keys of preselected users and to prohibit them from opening the lockbox.

Still another feature of the invention is the ability of the lockbox and key to cooperate so as to update a list of keys that are to be prevented from executing lockbox functions.

Yet another feature of the invention is the use of a low power, yet long range electromagnetic communications technique for exchanging signals between lockbox, key and stand components.

Still another feature of the invention is an arrangement whereby a user can enter the keystrokes needed to operate the lockbox into the key's keypad before the key is engaged with the lockbox, thereby facilitating operation of the lockbox in awkward or poorly lit locations.

Yet another feature of the invention is an arrangement whereby the access log maintained in the lockbox can be marked so that less than the entire contents of the log can be supplied to a requesting user.

The foregoing and additional features and advantages of the present invention will be more readily apparent from the following detailed description of a preferred embodiment thereof, which proceeds with reference to the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** shows a lockbox, a key, a stand and a computer used in a lockbox system according to the present invention.

FIG. **2** is a rear view, partially in section, schematically illustrating portions of a lockbox according to the present invention.

FIG. **3** is a sectional view taken along line **3—3** of FIG. **2**, schematically illustrating some of the locking components in a lockbox according to the present invention.

FIG. **4** is a top view of a shackle locking bar used in the lockbox of FIGS. **2** and **3**.

FIG. **5** is a rear elevational view of the shackle locking bar of FIG. **4**.

FIG. **6** is a right side view of a door stem used in the lockbox of FIGS. **2** and **3**.

FIG. **7** is a front elevational view of a lockbox shackle used in the lockbox of FIGS. **2** and **3**.

FIG. **8** is a sectional view of the case of the lockbox cf FIGS. **2** and **3** taken along line **8—8** of FIG. **2**.

FIG. **9** is a schematic block diagram of the electronic circuitry used in the lockbox of FIGS. **2** and

FIG. **10** is a plan view of a key according to the present invention.

FIG. **11** is a left side view of the key of FIG. **10**.

FIG. **12** is a schematic block diagram of the electronic circuitry used in the key shown in FIGS. **10** and **11**.

FIG. **13** is a diagram illustrating portions of the electronic memories used by the lockbox and key of the present invention.

FIG. **14** is a top plan view of a remote stand according to the present invention.

FIG. **15** is a sectional view taken along lines **15—15** of FIG. **14** and showing the stand with two different sizes of keys.

FIG. **16** is a sectional view taken along lines **16—16** of FIG. **14** and showing the stand coupled to a lockbox.

FIG. **17** is a rear elevational view of the stand shown in FIG. **14**.

FIG. **18***a* is a schematic block diagram of the electronic circuitry used a local stand according to the present invention.

FIG. **18***b* is a schematic block diagram of the electronic circuitry used in a remote stand according to the present invention.